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Using Telepresence Robots to Improve Disruptive Behavior in Students with Emotional Disturbance

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ABSTRACT OF THE THESIS

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Problem-solving consultation in school settings has been found to be an effective service delivery method to support educators struggling to address behavioral concerns for students with Emotional Disturbance (ED). Despite the benefits, many barriers to service providers, such as lack of time and competing obligations, restrict opportunities to offer problem solving-consultation to high-need schools that are otherwise unable to receive services. The caseload of a typical school psychologist often exceeds the levels specified in best practices, suggesting that it can be highly challenging for professionals to offer behavioral services to educators outside their necessary role for assessing special education eligibility. The purpose of this study is to evaluate the effectiveness and acceptability of telepresence robot problem-solving consultation (TRPSC) for reducing disruptive behaviors for the ED population. Using a randomized multiple baseline design, the proposed study will examine behavior outcomes of four middle school students as well as the effectiveness and acceptability ratings by educators of the TRPSC process in

self-contained ED classrooms. Educators will be involved in the consultation process and implement a behavior intervention plan (BIP) generated through teleconsultation for students with ED engaging in disruptive behaviors. It is hypothesized that implementing a BIP using TRPSC will result in (a) a decrease in students' disruptive behaviors, (b) acceptable ratings of the teleconsultation process by teachers, and (c) ratings by educators of the consultant and BIP as effective.

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Introduction

Educators are faced with a wide range of behavior concerns within self-contained classrooms that serve students with emotional disturbance (ED). One of the most challenging issues that educators of students with ED face is disruptive behaviors within the classroom (Keenan & Wakschlag, 2000; Owens et al., 2012). Although this is the case, less than 50% of the ED population is receiving behavioral interventions despite the fact that they are identified with a disability (Bradley, Doolittle, & Bartolotta, 2008). Therefore, the purpose of this study is to consider the effectiveness of telepresence robot problem-solving consultation (TRPSC) for reducing disruptive behaviors in the ED population.

The proposed study is a systematic replication of Bice-Urbach and Kratochwill (2016), who examined the consultation process via teleconsultation to improve student disruptive behaviors. However, to increase the acceptability, mobility, and utility of the teleconsultation service, a telepresence robot will be used to communicate with the educators and observe the students. This is in contrast to Bice-Urbach and Kratochwill (2016), who used stationary iPads and desktop computers. Furthermore, given the original study's focus on general education students alongside the historically negative outcomes for ED students (Bradley et al., 2008; Wagner, et al., 2005) and the high demand for behavioral consultation for educators serving these self-contained classrooms (Shook, 2012), this study will focus exclusively on that population.

Given the results from Bice-Urbach and Kratochwill (2016), I hypothesize that the implementation of the intervention generated through the TRPSC will lead to a decrease in student disruptive behavior. I also hypothesize that the mean teacher ratings will suggest comparable rates of acceptability for the telepresence robots to that of the original study. Many studies indicate that the use of teleconsultation can have a potentially positive impact on service delivery within the school setting (Fischer, Erchul, & Schultz, 2018). Still, there is pushback in relation to the ability to build rapport through teleconsultation and its overall usability. To combat that, I intend to use a telepresence robot that allows for the consultant and educators to interact more effectively and appropriately in the consultee's environment. This includes HIPAA- and FERPA-compliant software, mobility around the classroom environment, and a more personalized interaction due to the robot's ability to raise and lower itself to eye level (Fischer et al., 2018). Therefore, it is expected that the acceptability ratings will be high and comparable to those found in previous studies wherein teleconsultation without telepresence robots was conducted. Overall, the goal is to show that TRPSC can lead to positive behavior outcomes for students with ED and that educators find the process and results to be effective and acceptable.

Review of Literature

Emotional Disturbance

According to the National Center for Education Statistics (2016), approximately .7% of children enrolled in the United States are classified as emotionally disturbed (ED). Though a relatively small percentage of students are placed into this eligibility category

mandated by the Individuals with Disabilities Education Act (IDEA, 1997), they represent 5.7% of students receiving special education (U.S. Department of Education, Office of Special Education and Rehabilitative Services & Office of Special Education Programs, 2017). These students also represent a sizable portion of students who struggle to complete their education. Approximately 35% of students with ED drop out of high school, representing the disability group with the highest dropout rate (U.S. Department of Education, Office of Special Education and Rehabilitative Services & Office of Special Education Programs, 2017).

In a national longitudinal study, students with emotional and behavioral disorders (EBD), which includes Attention Deficit Hyperactivity Disorder, 97% of students were below expected grade level in math. These students were also suspended at at least double the rate of students without disabilities (Bradley, et al., 2008; Wagner, Newman, Cameto, Garza, & Levine, 2005). Researchers found that 55% of students with EBDs graduated with one in five continuing on to pursue any form of post-secondary education. Thirty percent of students were employed a year after high school (Wagner et al., 2005).

Initially proposed by Eli Bower (1960), the special education classification of ED states that children who fall under this classification must exhibit one or more of the following characteristics to a marked degree (U.S. Department of Education, 2017):

> i. The term means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance:

A. An inability to learn that cannot be explained by intellectual, sensory, or health factors.

B. An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.

C. Inappropriate types of behaviors or feelings under normal circumstances.

D. A general pervasive mood of unhappiness or depression.

E. A tendency to develop physical symptoms, pains or fears associated with personal or school problems.

ii. The term includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance.

The definition is vague and lacks guidance, but is likely to allow for flexibility among what different societies might deem as emotional deviance (Algozzine, 1978). A critical perspective on ED at its inception suggested that ED is an ecological issue that relates not only to a child's behavior, but also to how society deems and addresses the behaviors (Rhodes, 1967). Considering this view, an emotional disturbance is in the "eye of the beholder" (Algozzine, 2017).

Unlike the movement to generate improved operational criteria for identifying students with learning disabilities (LD), the category of ED has yet to blossom with a more finite definition. There has been continued criticism about the eligibility criteria,

methods of assessment, and the resources available to serve these students, with newer methods for identification emerging (Gresham, 2005). A commonly used tool is the *Scale for Assessing Emotional Disturbance* (SAED; Epstein & Cullinan, 1998). The SAED operationalizes the federal definition of ED by providing subscales for each of the characteristics of ED. These subscales include (a) inability to learn, (b) relationship problems, (c) inappropriate behavior, (d) unhappiness/depression, (e) physical symptoms or fears, (f) social maladjustment, and (g) adverse effect on educational performance. Unfortunately, the classification has ultimately served as a catch-all for students who exhibit the most severe internalizing and externalizing behaviors. Often these severe externalizing/internalizing behaviors can manifest most notably in the classroom as disruptive behaviors that are frequently observed among the ED student population.

Disruptive Behaviors of Children with ED

The federal definition states that children with ED exhibit "inappropriate behaviors." Though a vague description, inappropriate behaviors can present in the classroom as disruptive behaviors. Disruptive behaviors can be broadly defined as behaviors that interfere with the student's access to instruction, which can include hyperactivity, impulsivity, inattention, oppositionality, and aggression (Owens et al., 2012; Turton, Umbreit, & Mathur, 2011). Specific disruptive behaviors can include making inappropriate comments/vocalizations, throwing or banging on objects, or talking or touching peers at inappropriate times (Turton et al., 2011). Noncompliant or protesting behaviors are less disruptive but are often the impetus for more disruptive classroom behaviors (Musser, Bray, Kehle, & Jenson, 2001).

Disruptive behaviors are among the top five most common reasons for school psychologist referrals, with 26% being related specifically to conduct (Bramlett, Murphey, Johnson, Wallingsford, & Hall, 2002). As early as preschool, around half of children referred for services because of disruptive behaviors meet criteria for diagnosis that fall under the educational classification of ED with 51% for Oppositional Defiant Disorder (ODD) and 41% for Conduct Disorder (CD) (Keenan & Wakschlag, 2000). These behaviors are also associated with many long-term undesired outcomes, such as school failure, poor academic outcomes, substance use, mental health concerns, and criminal justice system involvement. Disruptive behaviors can be difficult to address in the classroom and are the most common reasons identified for teacher burnout (Owens et al., 2012). Unfortunately, many special education teachers who work with children with ED report that they do not have enough resources to support students with severe emotional or behavioral concerns (Bettini, 2017). It can be very challenging for an educator to focus on academic lessons while also having to manage an array of problematic behaviors that may occur during instruction. The physical placement of these students within the education system can offer insight on the lack of services available and why this population requires behavioral supports.

Nationally, 35.5% of students with ED aged six through 21 receive instruction outside of general education for more than 40% of the day (U.S. Department of Education, Office of Special Education and Rehabilitative Services & Office of Special Education Programs, 2017). Often these students are being served in self-contained classrooms or facilities for a majority of their day, surrounded by other ED students and

the same teacher/teacher aides. ED students being served in self-contained settings can result when schools attempt to increase the productivity and general education outcomes, but instead create more restrictive special education placements (Furney et al., 2003).

In general, teachers report feeling less self-efficacious, able, and willing to implement intensive interventions for students with severe problematic behaviors (Baker, 2005). Though teachers report to feeling comfortable using basic classroom management rules and routines, they report relying heavily on reactive approaches like punishment and removal from class when faced with more severe problem behaviors (Shook, 2012). Reactive consequence strategies may show some reduction in problematic behaviors, but the reduction is often short lived (Zhang, Katsiyannis, & Herbst, 2004). Reactive consequential strategies may come from the lack of intervention planning for specific child and target behavior. Creating behavior interventions plans (BIPS) based on applied behavior analysis (ABA) principles rather than continually using reactive strategies can lead to significant positive outcomes when dealing with problematic behavior. This process begins with comprehensive assessment of the problem behavior.

Behavioral Assessment

ABA focuses on improving objectively defined behaviors of social significance while demonstrating a reliable relationship between the improvements and the intervention being used (Cooper, Heron, & Heward, 2007). A notable aspect of ABA is that it considers the function, or the reason for the behavior, when planning the intervention. Therefore, functional assessment is considered a professional standard for assessing problem behaviors (Van Houten et al., 1988). Amendments to the Individuals

with Disabilities Act (IDEA) also require that, before placing a student with a disability in an alternative and more restrictive educational setting, a functional behavior assessment (FBA) must be conducted ([IDEA] Section 615(k)(1)(B)(i)).

A FBA will result in a four-term contingency model that defines setting events, antecedents, and maintaining consequences related to the problem behavior (Bambara & Kern, 2005). More formally, a FBA is described as a variety of assessment strategies that identify specific antecedents and consequences that control problem behavior (Horner, 1994). The purpose of a FBA is to identify environmental events that reliably predict and maintain the problem behavior (Steege & Watson, 2009). In a school setting, FBAs are conducted by the behavior analyst to identify specific relationships between behaviors and circumstances that increase the likelihood that behaviors that impede learning will occur (O'Neill et al., 1997).

A large body of empirical research has shown that FBA-informed interventions are equally effective across population types and settings (Goh & Bambara, 2010). A meta-analysis conducted by Goh and Bambara suggests that FBA-based interventions implemented in schools can effectively reduce problem behaviors of students while increasing their use of appropriate skills. Similarly, for children who have EBDs, the role of functional assessment is an essential tool for effective consultation (Gable et al., 1998). Evidence for FBA efficacy has been shown for students with behavioral disabilities exhibiting severe problem behaviors, specifically when multiple methods and sources are considered in the process (Gable, Park, & Scott, 2014; Stage, Cheney, Walker, & LaRocque, 2002). Considered to be best practice, a multiple element assessment may

include a variety of techniques used to collect information such as behavioral observations, behavior rating scales, interviews, reviews of existing records, and self-reports (Levitt & Merrell, 2009; Whitcomb & Merrell, 2013).

Though this can be a highly time-consuming process, the benefits of assessing and considering function prior to creating a behavior intervention plan (BIP) can be immense. Brief FBAs can be used more practically in the classroom setting because they less time consuming while still being accurate.

Behavioral Intervention

Ultimately, the purpose of conducting a FBA is to gain information that can logically link the assessment information to address the environmental determinants and function of the problem via an individualized behavior intervention plan. The assessor gathers information about the student's overall patterns of behavior, its conditions, and a reason for the behavior that ultimately drives the hypothesis that guides the individualized support (Turnbull et al., 2002). Decades of research support the use of functional behavior assessment as a critical intervention planning tool for students exhibiting problem behavior (Carr, Langdon, & Yarbrough, 1999; Lane, Umbreit, & Beebe-Frankenberger, 1999). Furthermore, interventions that do not address the function of the problem behavior are unlikely to be successful in reducing moderate to severe problem behavior in school settings (March & Horner, 2002; McIntosh, Campbell, Carter, & Rossetto Dickey, 2009; Newcomer & Lewis, 2004).

Best practice for addressing social-emotional/behavioral concerns involves using a multi-tiered prevention approach that emphasizes positive behavior supports (PBS;

National Association of School Psychology [NASP], 2015). The reauthorization of IDEA 2004 also requires that schools use PBS prior to special education placement (PBS; NASP, 2015). The OSEP National Technical Assistance Center on Positive Behavior Supports and Interventions states that schoolwide PBS has three components, including universal support, group support, and individualized support (Sugai et al., 2000).

Many researchers have advocated for multi-tiered systems of supports (MTSS) as an effective and efficient framework to deliver services to students. MTSS allows for students to be placed into typically three different categories, or tiers, with varying degrees of intensity and allocate supports accordingly. The PBS model follows this framework and can be considered a continuum, conceptualized as a tiered system, which considers the levels of specialized intensity necessary to accommodate students who are not responsive (Sugai & Horner, 2009). Tier 1 is focused on universal core instruction while tier 2 and 3 provide increasingly individualized and intensive interventions for both academics and behavior (Turnbull et al., 2002). Universal instruction refers to the core instruction or curriculum delivered to all students and assumes to allow for a majority (~80%) of the students to be at a proficient level. Tier 2 provides supplemental instruction to students who are not responding to tier 1 instruction (~15%). The most intensive and individualized interventions are implemented in tier 3 to increase a likelihood that a student responds to intervention (~5%). In this system, at least 20% of students will need more intensive supports. Students who are assessed and deemed qualified for special education, and placed within self-contained ED classrooms, would

be considered receiving tier 3 instruction. Ideally, these classrooms would be utilizing evidence-based strategies to improve positive outcomes for students.

Unfortunately, many studies have suggested that evidence-based practices and interventions to promote well-being (i.e., opportunities to respond, praise) are not being used in self-contained ED classrooms, despite the positive impact they can have on academic and behavioral outcomes (Maggin, Wehby, Moore Partin, Robertson, & Oliver, 2011). The need for multiple resources such as instructional resources, planning time, and professional learning experiences contribute to the lack of behavioral support for these students (Bettini, 2017). The lack of teacher preparation specifically for students with ED can be attributed to the lack of supports available to the educators. Only about 27% of special education training programs include a course on classroom management (Oliver & Reschly, 2010). In a national longitudinal study regarding the education of students with ED, only 25% to 33% of the students had teachers who reported receiving at least eight hours of training regarding issues related to working with students with disabilities (Wagner et al., 2006). Many general education teachers also report that they do not have the skills, resources (e.g., personnel, time, and monetary) to prevent and respond to the difficult behavior needs of students (Lane, 2004). Ultimately, teachers viewed themselves as having little-to-some competence for working in both the academic and behavioral challenges of students with emotional and behavioral disabilities (Cheney & Barringer, 1995). One of the most effective evidence-based interventions for increasing positive student outcomes for students with severe behavior concerns is problem-solving consultation (Kratochwill, Altschaefl, & Bice-Urbach, 2014).

Problem-Solving Consultation

Problem-solving consultation is one of the most effective methods of consultation within the school setting (Sheridan, Welch, & Orme, 1996). Consultation is an indirect process in which a specialist and one or more persons problem solve concerns presented by a client (Gutkin & Hickman, 1990). Problem-solving consultation is a relevant tool for experts to disseminate their knowledge to help provide services to children, who may be suffering academically, struggling behaviorally, or perhaps facing expulsion. The overall goal of problem-solving consultation is to promote students' performance and well-being. Additionally, the process can increase skills of teachers to mitigate future student difficulties (Erchul & Martens, 2010). It is a method for providing preventative educational and psychological services to students through a systematic problem-solving process among professionals.

There are many consultation models frequently used, including mental health consultation, organizational development consultation, and behavioral consultation (Caplan, 1970; Bergan & Kratochwill, 1990; Kratochwill, Elliott, & Callan-Stoiber, 2002). Bergan's model of behavior consultation outlines clear stages, goals, and objectives of the consultation process (Bergan & Kratochwill, 1990). Best practices in school-based consultation suggest using Bergan's model due to its emphasis of collaborative problem-solving processes described as problem-solving consultation (Kratochwill et al., 2002). Bergan and Kratochwill (1990) identified four stages of behavioral consultation that include the problem identification interview (PII), problem analysis interview, (PAI), plan implementation (PI), and problem evaluation interview

(PEI). The PII is utilized to establish rapport, agree upon roles, operationally define target behaviors, and discuss future data collection. During the PAI, the FBA results, goals, and development of behavior support plans are discussed. Unlike the previous mentioned steps, the PI is a less structured step that involves the intervention being implemented while difficulties are addressed, treatment fidelity is considered, and observations with feedback is conducted for the consultees. The PEI is used to discuss overall progress and barriers, treatment modification and continuation, and whether there is a need for further consultation. Effective school-based consultation is often based on the behavioral model because it outlines clear descriptions for each step of an effective problem-solving consultation process (Kratochwill et al., 2002).

Problems with Service Delivery

Although problem-solving consultation is a highly effective method for implementing evidence-based practices, there are a few problems with effectively implementing this process within the school. For example, Buchanan et al. (2009) found that only 37.5% of teachers were willing to engage in consultation with expert staff, while 65% were willing to be observed and receive feedback. Though teachers are more than willing to engage in consultation, it can be difficult to implement in the educational system for multiple reasons.

Many school psychologists report that problem-solving consultation is a difficult and time-consuming process when the practical restrains of their role or setting allow limited time. School psychologists have repeatedly indicated that they are unable to engage in consultation as often as they would like; they report acting in a consultative

role for 9.2 hours per week while preferring 13.1 hours per week (Hosp & Reschly, 2002). This is because competing responsibilities often take priority, such as strict deadlines to complete psychoeducational assessments and reports. Despite the evidence that psychological assessment has decreased overall since the introduction of MTSS, there has been only a slight change in the amount of time school psychologists participate in consultation (Larson & Choi, 2010).

Another major concern for school psychologists when considering any type of service delivery is the amount of time spent traveling. A survey of school psychologists in rural areas showed that the amount of time available for service delivery is directly affected by the amount of travel time required of the school psychologist (Clopton & Knesting, 2006). More than half of the sample reported spending over 30 minutes in their car each day, and 31% spent over an hour traveling.

When practical demands such as competing priorities and limited time due to travel necessities are considered, it seems logical that a school psychologist would face difficulties offering time-intensive problem-solving consultation services. Given the overall lack of availability for professionals to offer in-person behavioral support to educators, other modalities of communication should be considered.

Telehealth and Teleconsultation

Telehealth is defined as "the use of electronic information and telecommunication technologies to support long-distance clinical health care, patient and professional health related education, public health, and health administration" (Lustig, 2012, p. 3). The use of technology for service delivery was pioneered by the medical field, but was quickly

adopted by other health-related fields due to its efficiency and potential to address the issue of access in rural areas (American Academy of Child and Adolescent Psychiatry [AACAP], 2008; Grubaugh, Cain, Elahai, Patrick, & Frueh, 2008). Its effectiveness for both the clients and professionals involved has been documented across the fields of social work, psychology, and counseling (AACAP, 2008).

Telehealth initially was utilized in the 1950s with television technology to provide students with psychiatric training and feedback (AACAP, 2008). Within a decade, telemedicine was being used to connect urban populations to university mental health services (Hilty et al., 2006; Straker, Mostyn, & Marshall, 1976). Other than the few organizations utilizing telehealth at its inception (e.g., University of Nebraska, Massachusetts General Hospital), the regular use of technology did not occur until the late 1990s (AACAP, 2008).

High percentages of effectiveness reported by parents when asked to consider their satisfaction with primary care for their child with a developmental disorder suggests the acceptability of this use of technology (Langkamp et al., 2014). Diagnosis and treatment recommendations also have been found to produce comparable results for telepsychiatry and face-to-face patient contact (AACAP, 2008).

Telehealth can occur through two major modalities: (a) real time, synchronous communication between two or more parties (e.g., videoconferencing, text messages, telephone communications); and (b) digitally stored data transmitted using methods such as e-mail, hard drives, and virtual clouds. Researchers have found that combining these service delivery modalities provides both higher diagnostic accuracy and inter-rater

reliability with little cost or burden (Baba, Seckin & Kapdagli, 2005). It seems logical that effective teleconsultation should utilize both.

Consultation services delivered via videoconferencing is referred to as teleconsultation. It allows consultees and consultants to be in separate locations and interact as if they were in the same room (APA, 2013). Between 2000 and 2008, practitioners reported that their use of videoconferencing with clients had increased from 2% to 10% (Novotney, 2011). There are many reasons that both practitioners and clients could benefit from the practicality, efficiency, and ease of telecommunication to deliver services to people who otherwise would face difficulties receiving them. The benefits of such a modality suggest there may a need to integrate modern technology within school-based provisions to improve important outcomes for children.

Teleconsultation Within Schools

Telecommunication may be used as an effective method of communication to connect classroom teachers to professionals who are knowledgeable in behavior analysis. With the help of multiple modalities of telecommunication, school personnel could implement evidence-based practices with high implementation fidelity and reliable data collection. In one of the first studies done on telecommunication within a school setting for children with severe problem behaviors, Frieder et al. (2009) used web-based training for teachers that led to a successful functional analysis of a student problem. They set up cameras in the classrooms to allow for a live feed to the behavior analyst and used web-based training tools (i.e., DVDs with presentations, videos, and selected articles) to provide behavioral support to the staff. The team members reported considering the

behavior analyst a “friend” from the positive feedback and coaching provided. Despite the physical distance between the behavior analysts and school, the school personnel implemented a functional analysis, collected data, and collaborated with the analysts to analyze and interpret the data. The benefits of minimal cost technology within a school system suggest that utilizing telecommunication and teleconsultation for children who are at an elevated risk for failure could be extremely beneficial.

Currently, there are very few comprehensive studies that have examined the use of technology for school-based consultation services. In one key example, Bice-Urbach and Kratochwill (2016) critically considered the impact of teleconsultation specifically designed to improve the behavior of children within the classroom environment. With just the use of videoconferencing, the researchers developed an individualized behavior plan for multiple students, which resulted in the reduction of student disruptive behaviors. Specifically, the consultant used video cameras to directly observe behaviors to collect baseline data and corroborate the information that was given during the structured Problem Identification Interview. They utilized the Functional Assessment Interview (FAI; O’Neill et al., 1997) with each teacher to further examine the function of each student’s behavior. The consultant directly observed the student before and after the interview during the time the teacher had identified as the highest likelihood for the problem occurring. The information collected from the FAI assisted the consultant in developing the behavior support plan for each student. This process included: (a) obtaining operational definitions of the problem behavior; (b) summarizing brief functional assessment findings; (c) identifying intervention strategies to make the

behaviors ineffective, inefficient, or irrelevant (e.g., setting event strategies, consequence interventions aimed at reducing undesired behavior, interventions that must be taught to the student); (d) developing descriptions of the most challenging problem situations and routines; and (e) creating plans to monitor and evaluate the plan.

Bice-Urbach and Kratochwill (2016) were very thorough in following the specific behavior consultation procedures that characterize an effective problem-solving consultation. This strict adherence to the model may have been facilitated by the telecommunication experience that made observation, communication, and implementation manageable. Using a single case design, the researchers demonstrated a statistically significant overall decrease in student disruptive behavior. Declining rates of problem behavior were also documented by teacher report through the Goal Attainment Scale (GAS; Roach & Elliott, 2005). Following the study, consultees also found the teleconsultations and consultants to be effective. Statistically significant differences were not mentioned for the acceptability/feasibility measures but the ratings for the acceptability/feasibility forms, Consultant Evaluation Form (Erchul, 1987), and Behavior Intervention Rating System (Von Brock & Elliott, 1987) were all initially moderately high. Overall, this study did a thorough job of suggesting evidence that teleconsultation (and a problem-solving framework) via videoconferencing within a school system can result in a decrease in disruptive behaviors for students who were referred for those problems. Despite the potential benefits of this modality, however, some concerns remain about its use (Bice-Urbach, Kratochwill, & Fischer, 2018).

Some Concerns with Teleconsultation

One large concern with the use of technology to provide direct services to teachers and students is the loss of personal contact and thus rapport. It can be argued that it would be more challenging for the consultant to create a personal connection while not in the same room and on a screen (Bice-Urbach, 2015). Specifically, the lack of eye contact has been reported as the most challenging aspect of making a personal connection through videoconferencing (Pesamaa et al., 2004). Because consultees may feel that the consultant is not looking at them, they may lose a sense of rapport (AACAP, 2008). Suggestions of increasing rapport with telecommunications include creating the appearance of direct eye contact by the consultant alternating their gaze between the camera and the person on the screen, as well as positioning the camera to create an appearance of direct eye contact (AACAP, 2008).

Breaches in confidentiality are another concern to be addressed when using teleconsultative services. The Health Insurance Portability and Accountability Act (HIPAA, 2007) states that a patient's private information and data must be protected. Within the educational setting, the Family Education Rights and Privacy Act (FERPA, 1974) mandates the confidentiality of student's information. NASP Principles of Professional Ethics and the APA Ethics Committee have also released ethical guidelines to apply to videoconferencing that emphasize ensuring client confidentiality (APA, 2013; NASP 2000). To ensure confidentiality, only encrypted programs should be used when utilizing telecommunication to ensure a secure network (Novotney, 2011).

Reliability of service is also a consideration when utilizing a novel mode of service delivery. Specifically, dropped calls from poor wireless Internet connections

could hinder the effectiveness of the consultation. Some studies have reported difficulties like video freezing, loss of sound, and signal delays (Bishop, O'Reilly, Maddox, & Hutchinson, 2002; Kennedy & Yellowlees, 2000). Although a signal delay can lead to people talking over each other, the inconvenience has not been shown to affect the personal connection (Manning, Goetz, & Street, 2000).

A final criticism of using technology for problem-solving consultation is the accuracy of behavioral data collection via a video camera. The accuracy of behavioral data could potentially decrease with the use of technology versus *en vivo* data collection. One criticism raised by Bice-Urbach (2015) is that she did not have control over where the camera was placed. To address this issue, it was suggested that a camera be used that could be manipulated by the behavioral consultant or school psychologist from a distance. For this reason and the three preceding it, the current study proposes the use of a telepresence robot in problem-solving consultation.

Teleconsultation with Telepresence Robot

One solution to the concern over accurate data collection mentioned by Bice-Urbach (2015) is to utilize a telepresence robot that is controlled by the consultant. Essentially presenting as an iPad on a Segway, the telepresence robot can be manipulated around the busy environment of a classroom to capture more accurate behavioral data. It allows for mobility and access to many locations of the classroom without the assistance of staff members (Fischer, Bloomfield, Clark, McClelland, & Erchul, 2018). The height of the telepresence robot can also be raised and lowered to match the eye level of the

consultee. This feature has been reported as a key element in arguing the its use to increase rapport between the consultant and consultee (Fischer, Bloomfield, et al., 2018).

To date, only one published study has considered this modality in the classroom setting. Fischer and colleagues (2018) were interested in considering the functional relationship between an intervention identified via telepresence robot problem-solving consultation (TRPSC) and an increase in student compliant behavior. They used a nonconcurrent multiple baseline design across teacher-consultant dyads to evaluate prompting for increasing compliance with teacher instruction in special education classrooms. The participants included three children with three different disabilities: traumatic brain injury, intellectual disability, and autism spectrum disorder.

Consultants initially met with the teachers and paraprofessionals to deliver and set up the robot. They also provided training to the staff on how to operate the machine. The robot was in the classroom for two weeks initially to reduce reactivity and to acclimate all parties to the process. The consultants then conducted a PII with a teacher and paraprofessionals to identify baseline levels of the target behavior of each student's noncompliance. Following the PII, baseline data were collected for 7-17 days during the most problematic time of the day for each student. Once baseline data were collected, PAIs were held and intervention decisions were discussed for each child. The intervention was implemented for 12-46 intervention points. Consultants and staff met one final time for a PEI to review progress and discuss sustainability. The time from the initial PII to the PEI was approximately three months.

Fischer, Bloomfield, et al.'s (2018) goal was to see overall increases in compliant behavior. Across participants, results showed effect sizes ranged from small to large. The acceptability of this modality of teleconsultation was also a significant finding. The researchers also anecdotally noted that rapport building occurred through the in-person training on how the technology worked and seemed to increase teacher and paraprofessional buy-in. It was concluded that the user manuals and training on critical and novel steps of the procedures definitely should be provided to ensure the educators feel supported and prepared for the process. It is important to note that the concern of lack of rapport through teleconsultation did not seem to be an issue in this study. The authors concluded that the results of this study promote the use of TRPSC to provide students with access to behavioral services in the school setting.

Statement of the Problem

With the few studies that delve into teleconsultation for students with disabilities to improve behavior outcomes, the results of Fischer, Bloomfield, et al. (2018) suggest optimistic potential for future service delivery. Specifically, the most current use of telepresence robots for problem-solving consultation in the classroom setting brings potential for increased availability of services particularly for underserved and rural areas. Students with ED have continually been shown to have negative life outcomes despite being identified within the public-school system. Negative outcomes can be mitigated with increased behavior supports within the classroom. These services have the potential to be readily available for such an underserved population via TRPSC. Not only will the students benefit from the services, but also the consultees who gain valuable

behavior knowledge, strategies, and feedback during the consultative process can utilize those methods to serve future students. Therefore, the following hypotheses are proposed:

Hypotheses

Hypothesis #1: The implementation of problem-solving consultation delivered via telepresence robots will be associated with a decrease in disruptive behaviors for children with ED.

Hypothesis #2: Educators will rate the use of telepresence robots for problem-solving consultation for children with ED as acceptable.

Hypothesis #3: Educators will rate the consultant and behavior intervention plans developed from problem-solving consultation delivered via telepresence robots for children with ED as effective.

Method

Participants

This study would be conducted at a Southwestern middle school in the United States with six students who are classified with ED and placed into the school's self-contained ED program. Based on the percentage of students who receive free and reduced lunch, 75% of the students from the district come from low-income families. The ED placement involves students being taught by the same teacher for core classes, including English, Math, Science, and History within the self-contained classroom. Although the school follows a multi-tiered PBS framework, there are very few behavioral supports for these educators and students. Therefore, there is a need to utilize problem-solving consultation to improve student outcomes. To ensure that the students being referred for

the study are in fact classified with ED, their psychoeducational reports and files will be reviewed. Another measure will be used to ensure the students have significant rates of problem behavior and is described in the next section.

Instrumentation

Sutter-Eyberg Student Behavior Inventory - Revised. As a descriptive measure of the participants' externalizing behavior, and to increase comparability to the previous study, the Sutter-Eyberg Student Behavior Inventory - Revised (Rayfield, Eyberg, & Foote, 1998) will be completed by the teacher prior to the study. This measure has been found to have high internal consistency for both the Intensity scale ($\alpha = .98$) and Problem scale ($\alpha = .96$). With a total of 38 items, these are both relatively brief measures of behavior that take around 5 minutes to complete for each student. The instrument uses a 7-point Likert-type scale from 1 (*Never Exhibits Behavior*) to 7 (*Always Exhibits Behavior*).

Systematic direct observation. A key outcome to be considered will be the direct observation of disruptive behavior. Systematic direct observation will be conducted via telepresence robots throughout the study to calculate percent of intervals of disruptive behavior. The consultant will gain information on the specific target behavior of each student during problem-solving consultation. Bice-Urbach and Kratochwill (2016) study suggests that some of the disruptive behaviors may include noncompliance, tantruming, crying, movement, inattention, hitting/stomping, speaking out, or movement. Using partial interval recording to estimate the duration of disruptive behavior, students will be observed for a 15-minute session in the class the student is most likely to exhibit the

behavior. The sessions will be broken down into 15-second intervals and ultimately converted to the daily percentage of intervals where the target behavior is exhibited. Interobserver agreement (IOA) will be calculated across at least 20% of each phase using coefficient kappa (Cohen, 1968). The observers will be graduate-level school psychology students who have had previous experience with behavioral observation. To ensure mastery, all observers will undergo a training where they will observe and practice collecting behavioral data using the telepresence robot.

Technology Acceptability Model Instrument - Fast Form. Ratings of acceptability of the teleconsultation process will be collected via the FF-TAM (Chin, Johnson, & Schwarz, 2008). The questionnaire is designed to assess attitudes toward technology on three factors: usefulness, ease of use, and predicted usage. It is a 12-item scale rated from -3 (*Ineffective*) to 3 (*Effective*). The scale has demonstrated adequate internal consistency across its three factors ($\alpha = .93 - .97$).

Behavior Intervention Rating Scale. The acceptability and effectiveness of the consultation process and the identified intervention will be examined via an adapted version of the Behavior Intervention Rating Scale (BIRS; Von Brock & Elliott, 1987). This instrument uses a Likert-type scale that ranges from 1 (*Strongly Disagree*) to 6 (*Strongly Agree*). Fifteen items make up the BIRS Acceptability factor, which has demonstrated a Cronbach's alpha of .98 and suggesting utility within consultation research. The Effectiveness factor has a Cronbach's alpha of .92 and contains 9 items.

Consultant Evaluation Form. The educators' perceived effectiveness of the consultant will be evaluated with the Consultant Evaluation Form (CEF; Erchul, 1987).

The scale is comprised of 12 items rated on a Likert-type scale from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). This scale has demonstrated high internal consistency (α = .94).

Treatment integrity checklist. A checklist will be used to examine treatment integrity and ensure that the intervention was being implemented as intended (Bice-Urbach & Kratochwill, 2016). The checklist will include: (a) a description of each component in the BIP, (b) a rating of the level of adherence for each component, (c) a quality rating for each component, and (d) a section for general notes about the intervention implementation. The level of adherence and quality of implementation ratings range from 0 (*None/Poor*) to 3 (*Complete/Excellent*). The data will be collected via the telepresence robot by a graduate-level research assistant for at least 30% of the intervention phase.

Procedural integrity checklist. A checklist on procedural integrity will be conducted to ensure the required problem-solving steps of problem-solving (i.e.,) behavioral consultation (Kratochwill & Bergan, 1990) are aligned with the actual consultation interviews. All the core components of the Problem Identification Interview (PII), Problem Analysis Interview (PAI), and Problem Evaluation Interview (PEI) will be included in the checklist (Sanetti, Collier-Meek, Long, Byron, & Kratochwill, 2015). The consultant will complete the checklist immediately after each of the three interviews with the educator. For reliability, interviews will be audio recorded and an independent rater will check for integrity. Recordings will be stored on a password protected server only accessible to project staff.

Procedures

Using *What Works Clearinghouse Single-Case Design Pilot Standards* (Kratochwill et al., 2010), this randomized multiple-baseline design will allow for examination of systematic direct observation of student behavior and teacher ratings after implementation of an intervention. It is suggested that randomization in single-case design strengthens internal validity and allows for the use of randomized statistical tests (Kratochwill & Levin, 2010). Using single-case design is appropriate due to the applied nature of the research (Kazdin, 2011). Because the acceptability of this modality is being examined, using a withdrawal design may not be appropriate given that educator acceptability ratings may decrease if a successful intervention must be systematically removed.

The goal of this study is to test whether there is an effect on student outcomes by implementing a behavioral intervention via TRPSC. Given the practical nature of this study and problem-solving consultation in general, the selected evidence-based interventions will depend on the specific problem behavior that the participants exhibit. Because disruptive behavior is one of the most common referrals for students with ED, that will be the problem behavior identified and operationally defined and considered by the problem-solving process to evaluate effectiveness.

Prior to the beginning of the study, a brief training on the technology equipment for the study will be provided to the educators. The consultant will set up the device within the classroom and have the educators practice running it. Protocols will be

provided that offer basic information on running/shutting down the Double and troubleshooting tips. Specifically, procedures about what to do if the educator cannot connect to the wireless network will be included. At this training, educators will also complete the descriptive measure for the students identified for participation.

A total of five structured interviews will be conducted as part of the problem-solving consultation process. The PII will be the first interview that establishes rapport, discusses the goals, objectives, and data collection procedures associated with consultation and operationally defines the target behavior(s). After this interview, the consultant will begin observations to collect baseline data of target behaviors. After the PII, baseline data on student disruptive behavior will be collected and the consultant will begin the FBA process by conducting systematic direct observations on the target behavior(s) and conducting a Functional Assessment Interview (FAI; O'Neill, Albin, Storey, Horner & Sprague, 2015). The FAI will be the second interview and will be used to examine the function of the student's disruptive behavior.

The consultant will go over the baseline data collected in the PAI, or the third structured interview. The consultant will also share a drafted BIP with the educator in the PAI. The BIP will include: (a) operational definitions of the target behavior; (b) a summary of the FBA; (c) intervention strategies to prevent antecedents, teach replacement/ desired behaviors, and reinforce; (d) descriptions of the most challenging situations and routines; and (e) the plan to monitor and evaluate the BIP (O' Neill et al., 2015). Given the disruptive behavior typical of children with ED, and consistent with Bice-Urbach and Kratochwill (2016), the BIP will likely include setting event strategies,

antecedent strategies, instructional/teaching interventions that must be taught to the student, and consequence strategies aimed at reducing undesired behavior. This PAI will allow educators to discuss the feasibility of the BIP and troubleshoot any concerns. After completion of the PAI, the intervention will be implemented.

During the fourth interview, Plan Implementation (PI), the BIP will be implemented by the educators and data on disruptive behavior will begin being collected. The fourth interview will consist of providing feedback to the educator on the BIP implementation. The goal will be to discuss strategies that are going well as well as strategies that have been implemented with poorer fidelity or not at all. The fifth and final planned interview will be the PEI. Progress, potential treatment modification, and intervention effectiveness will be discussed in this interview.

The four questionnaires will be given at two separate time points. The Sutter-Eyberg Student Behavior Inventory descriptive measure will be the first measure administered to the educators after the students have been identified and consent has been received. After the fifth and final consultation interview, the BIRS, CEF, and FF-TAM, will be distributed and completed by the educators.

Equipment

The Double telepresence robot created by Double Robotics ™ will be the device utilized for this study. Double Robotics ™ is currently one of the leading companies in telepresence robotics and has made over 20 million dollars in sales since 2013 (Yeung, 2017). This device has been utilized in headquarters of organizations such as LinkedIn, Reddit, GE Power, and Duke University. This device can dynamically move and look

around the environment, unlike a stationary device with limited capabilities. To date, Fischer, Bloomfield, et al., (2018) have been the only research team to use this device in a school setting. Outside of the work done with Fischer and colleagues, the current literature on mobile robot telepresence has strictly focused on applications within the medical and business settings. (Kristoffersson, Coradeschi, & Loutfi, 2013).

Data Analysis/Results

Visual analysis will be conducted to examine the results of student disruptive behavior. Means and standard deviations of each student will be reported. The data will be evaluated by *WWC Single-Case Design Pilot Standards* (Kratochwill et al., 2010). The four visual inspection criteria specified by Kazdin (2011, pp. 288) to evaluate data for single-case experiments will also be used: (a) changes in mean across phases, (b) changes in level across phases, (c) changes in trend or slope, and (d) latency of change. Based on the results of previous studies (Bice-Urbach & Kratochwill, 2016; Fischer, Bloomfield, et al., 2018), it is hypothesized that students will demonstrate decreases in disruptive behaviors. Results of this visual analysis will speak to the first hypothesis regarding intervention implemented via TRPSC to decrease students' disruptive behavior.

The second and third hypotheses will be examined by reviewing educators' ratings of acceptability and effectiveness from the FF-TAM, CEF, and BIRS measures. Mean ratings and standard deviations will be provided for all measures. It is expected that mean ratings of all these measures will be acceptable.

Conclusion

The goal of this study will be to examine whether a remote problem-solving consultation process conducted via telepresence robots can be effective and feasible for middle school students with ED. If the results suggest a functional relationship between the implementation of the intervention and a decrease in student disruptive behavior, then there are implications for school psychologists' ability to offer services remotely. Though problem-solving consultation is a time-consuming process that school psychologists are often unable to engage in due to practical constraints, telepresence robots may allow them to more effectively serve students and educators who receive few supports within the school system. With the serious need for behavior supports for children with disabilities, not only would telecommunication allow for effective consultation and training about behavior principles and evidence-based interventions to improve the target student outcomes, but also it would help improve outcomes for future students. Though the goal of consultation is to improve a current student's outcomes, if done effectively, the consultation process could lead to long-lasting influences on educators and classrooms that are a part of the larger process.

References

Algozzine, B. (2017). Toward an acceptable definition of emotional disturbance: waiting for the change. *Behavioral Disorders*, *42*(3), 136-144.

Algozzine, B., Schmid, R., & Conners, B. (1978). Toward an acceptable definition of emotional disturbance. *Behavioral Disorders, 4*(1), 48-52.

American Academy of Child and Adolescent Psychiatry (AACAP) (2008). Practice parameter for telepsychiatry with children and adolescents. *Journal of the American Academy for Child and Adolescent Psychiatry, 47*(12), 1468-1483.

American Psychological Association (APA) (2013). Guidelines for the practice of telepsychology. *American Psychologist, 68*(9), 791–800.

Baba, M., Seçkin, D., & Kapdağlı, S. (2005). A comparison of teledermatology using store-and-forward methodology alone, and in combination with Web camera videoconferencing. *Journal of Telemedicine and Telecare, 11*, 354 –360.

Bambara, L. M., & Kern, L. (2005). *Individualized supports for students with problem behaviors: Designing positive behavior plans*. New York, NY: Guilford.

Bettini, E. A., Cumming, M. M., Merrill, K. L., Brunsting, N. C., & Liaupsin, C. J. (2017). Working conditions in self-contained settings for students with emotional disturbance. *The Journal of Special Education, 51*(2), 83-94.

Bergan, J. R., & Kratochwill, T. R. (1990). *Behavioral consultation and therapy.* Plenum Press.

Bice-Urbach, B. J., & Kratochwill, T. R. (2016). Teleconsultation: The use of technology to improve evidence-based practices in rural communities. *Journal of School Psychology, 56*, 27-43.

Bice-Urbach, B., Kratochwill, T., & Fischer, A. J. (2018). Teleconsultation: Application to provision of consultation services for school consultants. *Journal of Educational and Psychological Consultation, 28*(3), 255–278.

Bishop, J. E., O'Reilly, R. L., Maddox, K., & Hutchinson, L. J. (2002). Client satisfaction in a feasibility study comparing face-to-face interviews with telepsychiatry. *Journal of Telemedicine and Telecare, 8*(4), 217-221.

Bower, E. M. (1960). Early identification of emotionally handicapped children in school. Oxford, England: Charles C Thomas.

Bradley, R., Doolittle, J., & Bartolotta, R. (2008). Building on the data and adding to the discussion: The experiences and outcomes of students with emotional disturbance. *Journal of Behavioral Education, 17*(1), 4-23.

Bramlett, R. K., Murphy, J. J., Johnson, J., Wallingsford, L., & Hall, J. D. (2002). Contemporary practices in school psychology: A national survey of roles and referral problems. *Psychology in the Schools, 39*(3), 327-335.

Buchanan, R., Gueldner, B. A., Tran, O. K., & Merrell, K. W. (2009). Social and emotional learning in classrooms: A survey of teachers' knowledge, perceptions, and practices. *Journal of Applied School Psychology, 25*(2), 187-203.

Caplan, G. (1970). *The theory and practice of mental health consultation*. Basic Books.

Carr, E. G., Langdon, N. A., & Yarbrough, S. C. (1999). Hypothesis-based intervention for severe problem behavior. In A. C. Repp and & R. Horner (Eds.), *Functional analysis of problem behavior: From effective assessment to effective support* (pp. 9-31). Belmont, CA: Wadsworth.

Cheney, D., & Barringer, C. (1995). Teacher competence, student diversity, and staff training for the inclusion of middle school students with emotional and behavioral disorders. *Journal of Emotional and Behavioral Disorders, 3*(3), 174-182.

Chin, W. W., Johnson, N., & Schwarz, A. (2008). A fast form approach for measuring technology acceptance and other constructs. *MIS Quarterly, 32*, 687–703.

Clopton, K. L., & Knesting, K. (2006). Rural school psychology: Re-opening the discussion. *Journal of Research in Rural Education, 21*(5), 1-11.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis, 2nd edition*. Upper Saddle River, NJ: Pearson.

Cohen, J. (1968). Weighted kappa: Nominal scale agreement provision for scaled disagreement or partial credit. *Psychological Bulletin, 70*(4), 213-220.

Epstein, M. H., & Cullinan, D. (1998). *Scale for assessing emotional disturbance.* Austin, TX: Pro-Ed.

Erchul, W. P. (1987). A relational communication analysis of control in school consultation. *Professional School Psychology, 2*(2), 113-124.

Erchul, W. P., & Martens, B. K. (2010). *School consultation: Conceptual and empirical bases of practice (3rd ed).* New York, NY: Springer.

Family Education Rights and Privacy Act of 1974, 20 U. S. C. §§ 1232g (1974).

Fischer, A. J., Bloomfield, B. S., Clark, R. R., McClelland, A. L., & Erchul, W. P. (2018). Increasing student compliance with teacher instructions using telepresence robot problem-solving teleconsultation. *International Journal of School & Educational Psychology*, 1-15. Published online 8-28-18.

Fischer, A. J., Dart, E. H., Radley, K. C., Richardson, D., Clark, R., & Wimberly, J. (2017). An evaluation of the effectiveness and acceptability of teleconsultation. *Journal of Educational and Psychological Consultation, 27*(4), 437-458.

Fischer, A. J., Erchul, W. P., & Schultz, B. K. (2018). Teleconsultation as the new frontier of educational and psychological consultation: Introduction to the special issue. *Journal of Educational and Psychological Consultation, 28*(3), 1-6.

Frieder, J. E., Peterson, S. M., Woodward, J., Crane, J., & Garner, M. (2009). Teleconsultation in school settings: Linking classroom teachers and behavior analysts through web-based technology. *Behavior Analysis in Practice, 2*(2), 32.

Furney, K. S., Hasazi, S. B., Clark/Keefe, K., & Hartnett, J. (2003). A longitudinal analysis of shifting policy landscapes in special and general education reform. *Exceptional Children, 70*(1), 81-94.

Gable, R. A., Park, K. L., & Scott, T. M. (2014). Functional behavioral assessment and students at risk for or with emotional disabilities: Current issues and considerations. *Education and Treatment of Children, 37*(1), 111-135.

Gable, R. A., Sugai, G., Lewis, T., Nelson, J. R., Cheney, D., Safran, S. P., & Safran, J. S. (1998). *Individual and Systemic Approaches to Collaboration and Consultation on Behalf of Students with Emotional/Behavioral Disorders. From the Second CCBD Mini Library Series: Successful Interventions for the 21st Century.* Council for Exceptional Children, 1920 Association Dr., Reston, VA 20191-1589.

Goh, A. E., & Bambara, L. M. (2012). Individualized positive behavior support in school settings: A meta-analysis. *Remedial and Special Education, 33*(5), 271-286.

Gresham, F. (2005). Response to Intervention: An Alternative Means of Identifying Students as Emotionally Disturbed. *Education and Treatment of Children, 28*(4), 328-344.

Grubaugh, A. L., Cain, G. D., Elahai, J. D., Patrick S. L., & Frueh, B. C. (2008). Attitudes toward medical and mental health care delivered via telehealth applications among rural and urban primary care patients. *Journal of Nervous and Mental Disease, 196*(2), 166-170.

Gutkin, T. B., & Hickman, J. A. (1990). The relationship of consultant, consultee, and organizational characteristics to consultee resistance to school-based consultation: An empirical analysis. *Journal of Educational and Psychological Consultation, 1(*2), 111- 122.

Health Insurance Portability and Accountability Act (HIPAA). (2007). Security Standard.

Hilty, D. M., Yellowlees, P. M., Cobb, H. C., Bourgeois, J. A., Neufeld, J. D., & Nesbitt, T. S. (2006). Models of telepsychiatric consultation-liaison service to rural primary care. *Psychosomatics, 47(*2), 152-157.

Horner, R. H. (1994). Functional assessment: Contributions and future directions. *Journal of Applied Behavior Analysis, 27(*2), 401-404.

Hosp, J.L., & Reschly, D.J. (2002). Regional differences in school psychology practice. *School Psychology Review, 31* (1), 11-29. Individuals with Disabilities Education Act (IDEA; 1997), 20, U.S.C. § 1400

Individuals with Disabilities Education Improvement Act, 20 U.S.C.§ 1400 (2004).

Kazdin, A. E. (2011). *Single-case research designs: Methods for clinical and applied settings.* New York, NY: Oxford University Press.

Keenan, K., & Wakschlag, L. S. (2000). More than the Terrible Twos: The Nature and Severity of Behavior Problems in Clinic-Referred Preschool Children. *Journal of Abnormal Child Psychology, 28*(1), 33–46.

Kennedy, C., & Yellowlees, P. (2000). A community-based approach to evaluation of health outcomes and costs for telepsychiatry in a rural population: preliminary results. *Journal of Telemedicine and Telecare, 6*, 155-157.

Koehler, M. J., & Levin, J. R. (1998). Regulated randomization: A potentially sharper analytical tool for the multiple-baseline design. *Psychological Methods, 3*(2), 206.

Kratochwill, T. R., & Bergan, J. R. (1990). *Behavioral consultation in applied settings: An individual guide.* New York, NY: Springer Science & Business Media.

Kratochwill, T. R., Altschaefl, M. R., & Bice-Urbach, B. (2014). Best practices in problem solving consultation: Applications in prevention and intervention systems. In P. Harrison & A. Thomas (Eds.), *Best practices in school psychology V* (pp.461-482). Bethesda, MD: National Association of School Psychologists.

Kratochwill, T. R., Elliott, S. N., & Callan-Stoiber, K. (2002). Best practices in school-based problem-solving consultation. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology IV* (pp. 583-608). Washington, DC, US: National Association of School Psychologists.

Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., & Shadish, W. R. (2010). Single-case designs technical documentation. *What works clearinghouse.* Retrieved from What Works Clearinghouse website: http://ies.ed.gov/ncee/wwc/pdf/wwc_scd.pdf.

Kratochwill, T. R., & Levin, J. R. (2010). Enhancing the scientific credibility of single-case intervention research: Randomization to the rescue. *Psychological Methods, 15*(2), 124.

Kristoffersson, A., Coradeschi, S., & Loutfi, A. (2013). A review of mobile robotic telepresence. *Advances in Human-Computer Interaction, 2013,* 3.

Lane, K. L. (2004). Academic instruction and tutoring interventions for students with emotional/behavioral disorders: 1990 to present. In R. B. Rutherford, M. M. Quinn, & S. Mathur (Eds.), *Handbook of Research in Emotional and Behavioral Disorders,* (pp. 462-486). New York, NY: Guilford.

Lane, K. L., Umbreit, J., & Beebe-Frankenberger, M. E. (1999). Functional assessment research on students with or at risk for EBD: 1990 to the present. *Journal of Positive Behavior Interventions, 1*(2), 101-111.

Langkamp, D. L., McManus, M. D., & Blakemore, S. D. (2015). Telemedicine for children with developmental disabilities: a more effective clinical process than office-based care. *Telemedicine and e-Health, 21*(2), 110-114.

Larson, J. P., & Choi, H. S. (2010). The effect of university training and educational legislation on the role and function of school psychologists. *Journal of Applied School Psychology*, *26*(2), 97-114.

Levitt, V. H., & Merrell, K. W. (2009). Linking assessment to intervention for internalizing problems of children and adolescents. *School Psychology Forum, 3*(1).

Lustig, T. A. (2012). The role of telehealth in an evolving health care environment: Workshop summary. Washington, DC: The National Academies Press.

Maggin, D. M., Chafouleas, S. M., Goddard, K. M., & Johnson, A. H. (2011). A systematic evaluation of token economies as a classroom management tool for students with challenging behavior. *Journal of School Psychology*, *49*, 529-544.

Maggin, D., Wehby, J., Partin, T., Robertson, R., & Oliver, R. (2011). A comparison of the instructional context for students with behavioral issues enrolled in self-contained and general education classrooms. *Behavioral Disorders, 36*(2), 84-99.

Manning, T. R., Goetz, E. T., & Street, R. L. (2000). Signal delay effects on rapport in telepsychiatry. *Cyberpsychology & Behavior, 3*(2), 119-127.

March, R. E., & Horner, R. H. (2002). Feasibility and contributions of functional behavioral assessment in schools. *Journal of Emotional and Behavioral Disorders, 10*(3), 158-170.

McIntosh, K., Campbell, A. L., Carter, D. R., & Rossetto Dickey, C. (2009). Differential effects of a tier two behavior intervention based on function of problem behavior. *Journal of Positive Behavior Interventions, 11*(2), 82-93.

Moore, T. C., Wehby, J. H., Oliver, R. M., Chow, J. C., Gordon, J. R., & Mahany, L. A. (2017). Teachers' reported knowledge and implementation of research-based classroom and behavior management strategies. *Remedial and Special Education, 38*(4), 222–232.

Musser, E. H., Bray, M. A., Kehle, T. J., & Jenson, W. R. (2001). Reducing disruptive behaviors in students with serious emotional disturbance. *School Psychology Review, 30*(2), 294.

National Association of School Psychologists (NASP). (2000). *Professional conduct manual.* Bethesda, MD: Author.

National Association of School Psychologists (NASP). (2015). NASP position statement on appropriate behavioral, social, and emotional supports to meet the needs of all students. Retrieved September 13, 2018, from https://www.nasponline.org/Documents/Research%20and%20Policy/Position%20Statements/AppropriateBehavioralSupports.pdf

Newcomer, L. L., & Lewis, T. J. (2004). Functional behavioral assessment: An investigation of assessment reliability and effectiveness of function-based interventions. *Journal of Emotional and Behavioral Disorders, 12*(3), 168-181.

Novotney, A. (2011). A new emphasis on telehealth: How can psychologists stay ahead of the curve- and keep patients safe? *Monitor on Psychology, 42*(6), 40–44.

Office of Special Education and Rehabilitative Services (Ed). (2017). *39Th Annual Report to Congress on the Implementation of the" Individuals with Disabilities Education Act,*" 2007. Office of Special Education and Rehabilitative Services.

Oliver, R. M., & Reschly, D. J. (2010). Special education teacher preparation in classroom management: Implications for students with emotional and behavioral disorders. *Behavioral Disorders, 35*(3), 188-199.

O'Neill, R. E., Albin, R. W., Storey, K., Horner, R. H., & Sprague, J. R. (2015). *Functional assessment and program development*. Toronto, ON: Nelson Education.

O'Neill, R. E., Horner, R. H., Albin, R. W., Storey, K., Sprague, J. R., & Newton, J. S. (1997). Functional assessment of problem behavior: A practical assessment guide. Pacific Grove, CA: Brooks/Cole.

OSEP Center on Positive Behavioral Interventions, Sugai, G., Horner, R. H., Dunlap, G.,

Hieneman, M., Lewis, T. J., ... & Turnbull, A. P. (2000). Applying positive behavior support and functional behavioral assessment in schools. *Journal of Positive Behavior Interventions, 2(*3), 131-143.

Owens, J. S., Holdaway, A. S., Zoromski, A. K., Evans, S. W., Himawan, L. K., Girio-Herrera, E., & Murphy, C. E. (2012). Incremental benefits of a daily report card intervention over time for youth with disruptive behavior. *Behavior Therapy, 4*3(4), 848–861.

Pesamaa, L., Ebeling, H., Kuusimaki, M., Winbald, I., Isohanni, M., & Moilanen, I. (2004). Videoconferencing in child and adolescent telepsychiatry: A systematic review of the literature. *Journal of Telemedicine and Telecare, 1*0, 187-192.

Rayfield, A., Eyberg, S. M., & Foote, R. (1998). Revision of the Sutter-Eyberg Student Behavior Inventory: Teacher ratings of conduct problem behavior. *Educational and Psychological Measurement, 58*(1), 88-98.

Rhodes, W. C. (1967). The disturbing child: A problem of ecological management. *Exceptional children, 33*(7), 449-455.

Sanetti, L. M. H., Collier-Meek, M. A., Long, A. C., Byron, J., & Kratochwill, T. R. (2015). Increasing teacher treatment integrity of behavior support plans through consultation and implementation planning. *Journal of School Psychology, 53*(3), 209-229.

Shook, A. C. (2012). A study of preservice educators' dispositions to change behavior management strategies. *Preventing School Failure: Alternative Education for Children and Youth, 56*(2), 129–136.

Stage, S. A., Jackson, H. G., Moscovitz, K., & Erickson, M. J. (2006). Using multimethod-multisource functional behavioral assessment for students with behavioral disabilities. *School Psychology Review, 35*(3), 451.

Steege, M. W., & Watson, T. S. (2009). *Conducting school-based functional behavioral assessments: A practitioner's guide.* New York, NY: Guilford.

Straker, N., Mostyn, P., & Marshall, C. (1976). The use of two-way TV in bringing mental health services to the inner city. *The American Journal of Psychiatry, 133*(10), 1202-1205.

Sugai, G., & Horner, R. H. (2009). Responsiveness-to-intervention and school-wide positive behavior supports: Integration of multi-tiered system approaches. *Exceptionality, 17*(4), 223-237.

Turnbull, A., Edmonson, H., Griggs, P., Wickham, D., Sailor, W., Freeman, R., ... & Riffel, L. (2002). A blueprint for schoolwide positive behavior support: Implementation of three components. *Exceptional Children, 68*(3), 377-402.

Turton, A. M., Umbreit, J., & Mathur, S. R. (2011). Systematic function-based intervention for adolescents with emotional and behavioral disorders in an alternative setting: Broadening the context. *Behavioral Disorders, 36*(2), 117–128.

U.S. Department of Education, National Center for Education Statistics. (2016). *Digest of Education Statistics, 2015* (NCES 2016-014), Table 204.30

U.S. Department of Education. (2016). *Institute of Education Sciences, National Center for Education Statistics.*

U.S. Department of Education. (2004). Building the legacy: IDEA 2004.

Van Houten, R., Axelrod, S., Bailey, J. S., Favell, J. E., Foxx, R. M., Iwata, B. A., & Lovaas, O. I. (1988). The right to effective behavioral treatment. *The Behavior Analyst*, 11, 111-114.

Von Brock, M. B., & Elliott, S. N. (1987). Influence of treatment effectiveness information on the acceptability of classroom interventions. *Journal of School Psychology, 25*(2), 131-144.

Wagner, M., Friend, M., Bursuck, W. D., Kutash, K., Duchnowski, A. J., Sumi, W. C., &

Epstein, M. H. (2006). Educating students with emotional disturbances: A national perspective on school programs and services. *Journal of Emotional and behavioral disorders, 14*(1), 12-30.

Wagner, M., Newman, L., Cameto, R., Garza, N., & Levine, P. (2005). After high school: A first look at the postschool experiences of youth with disabilities. A report from the National Longitudinal Transition Study-2 (NLTS2). Menlo Park, CA: SRI International.

Whitcomb, S., & Merrell, K. W. (2013). *Behavioral, social, and emotional assessment of children and adolescents*. New York, NY: Routledge.

Yeung, K. (2017). Double Robotics says it has sold 8,000 robots and generated $20 million in sales since 2013. Retrieved from https://venturebeat.com/2017/01/16/double-robotics-says-it-has-sold-8000-robots-and-generated-20-million-in-sales-since-2013/

Zhang, D., Katsiyannis, A., & Herbst, M. (2004). Disciplinary exclusions in special education: A 4-Year analysis. *Behavioral Disorders, 29*(4), 337–347.

Zins, J. E., & Erchul, W. P. (2002). Best practices in school consultation. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology IV* (pp. 625-643). Washington, DC, US: National Association of School Psychologists.